Yelp Analysis of Hotel Businesses

Thursday Group 4:

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Introduction

Introduction

- **Primary Goal:**
  - Develop business recommendations for hotels
- **Method:**
  - Natural language processing
  - Determine importances of words and phrases
  - Analyze results to make suggestions
- **Secondary Goal:**
  - Develop model to predict review ratings for all data

Our Approach

Data Processing & Model

- **Natural Language Processing**
  - Extracted words <u>and</u> noun phrases from the text
  - Convert words to root form using part-of-speech information
    - This is called *lemmatization*
  - Used Tf-Idf to create sparse matrix of 20,000 most frequent terms
- **2 Methods for Determining Feature Importance**
  - Extracted relative feature importance from random forest
  - Spearman correlation coefficient between phrases and # stars
- **Predictions**
  - Used gradient boosting to generate final predictions for the full dataset

Business Recommendations

1. Better Staff Training

- Average scores in reviews containing…
  - Positive words/phrases: **3.67**
  - Negative words/phrases: **1.54**
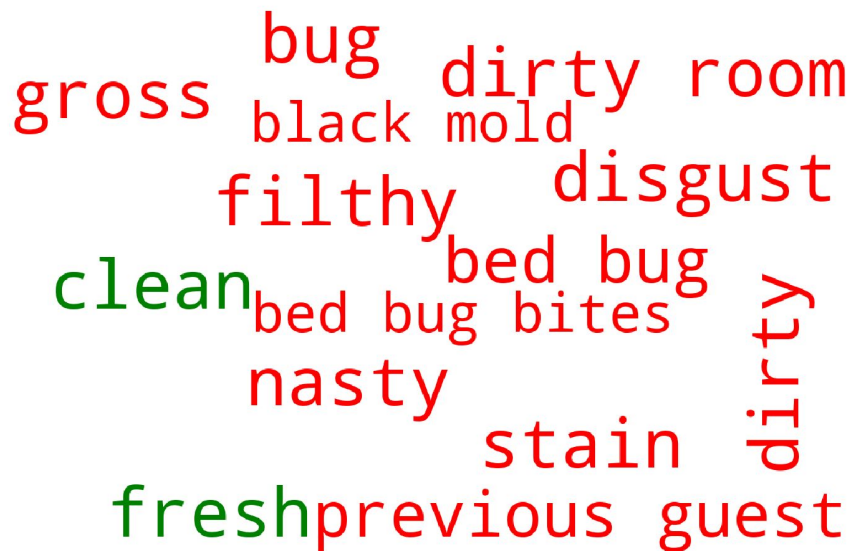- *t*-test is significant (p−value < 0.001)

customer service

1. Better Staff Training

- Examples in reviews:
  - "Our server was very pleasant and helpful, and my wife got a birthday card from the staff since it was her birthday." ★★★★★
  - "So great job on the service to their staff on keeping me comfortable." ★★★★★
  - "The majority of the hotel staff was extremely rude and unfriendly." ★

- **Recommendation:**
  - Strongly recommend that hotel owners incorporate training procedures for their staff which emphasize friendliness, helpfulness, and professionalism.

2. Improve Cleanliness

- Average scores in reviews containing...
  - Positive words/phrases: **3.55**
  - Negative words/phrases: **1.89**

- *t*-test is significant (p−value < 0.001)
- This topic is mostly mentioned in negative reviews.

bug

gross dirty room

black mold

disgust

filthy

clean bed bug

bed bug bites

nasty

stain dirty

freshprevious guest

2. Improve Cleanliness

- Examples in reviews:
  - "The hotel felt welcoming and clean walking in." ★★★★★
  - "The overall cleanliness was questionable, and the carpets had many stains." ★
  - "They barely cleaned the rooms, never replaced towels" ★

- **Recommendation**:
  - Hire more cleaning staff or retrain staff to do a better job of cleaning.

3. Ensure High-Quality Restaurants

- Average scores in reviews containing...
  - Positive words/phrases: **3.31**
  - Negative words/phrases: **3.24**

- *t*-test is significant (p–value < 0.001)
- This topic is mostly mentioned in positive reviews.

3. Ensure High-Quality Restaurants

- Examples in reviews:
  - "There's so much food to choose from downstairs!" ★★★★★
  - "Breakfast menu was considerably smaller and a lot less options, but the food was really good." ★★★★★
  - "The food (even for Vegas) is really overpriced and mediocre." ★

- **Recommendations:**
  - Hold their restaurants to high standards.
  - Offer take-out and delivery options for guests, since this is a common complaint.

4. Miscellaneous Recommendations

- "**Coffee**" is mentioned frequently in reviews
  - Frequent related phrases: "coffee maker", "coffee pot", "coffee shop", "free coffee"
- Examples:
  - "I love the lobby wine & hot apple cider hour in the afternoons, and the lobby coffee & hot chocolate bars in the mornings." ★★★★★
  - "They do serve Starbucks coffee downstairs in their cafe and have free wifi." ★★★★
  - "Coffee in room $4.00 a cup- joke." ★★
- **Recommendations:**
  - Have a decent coffee shop in it for guests to visit.
  - Put coffee machines and free coffee in hotel rooms for the guests.

4. Miscellaneous Recommendations

- Average stars in reviews that…
  - Mentioned **pools or hot tubs**: 3.55
  - Did not mention pools or hot tubs: 3.21
  - (p−value from *t*-test < 0.001)
- Examples:
  - "The bathroom is gorgeous with two sinks, a separate vanity area, a big tub."
    ★★★★★
  - "I have never seen such a mess at a pool area…." ★
- **Recommendation:**
  - Hotel owners who are renovating or constructing hotels spend some money on a good pool and a few hot tubs for the guests.

4. Miscellaneous Recommendations

- Average stars at hotels with…
  - Free WiFi: 3.29
  - Paid WiFi: 3.17
  - (p−value from t-test < 0.001)
- Examples:
  - "Free wifi!" ★★★★★
  - "Internet wifi did not work." ★
- **Recommendation:**
  - Make WiFi freely accessible for guests.

4. Miscellaneous Recommendations

Topics	Examples	Recommendation
Extra fee	"On top of that they were charging us "extra fees". I'm never come back here and don't recommend it for anyone." ★	Reduce the number of extra fees they charge or specify the fees exactly.
Security	"We really felt safe with the Security doing random vehicle checks and the Suite elevator Security making sure only guests can go to the Suites." ★★★★★	Add a few security guards to their hotels (or make the existing security guards more visible to guests).
Noise level	"Maybe if we didn't have loud ass neighbors this review would get 3 stars." ★★	Soundproof hotel rooms or respond more consistently to noise complaints.

Summary

Low Cost	Medium Cost	High Cost
● Offer free coffee ● Make your WiFi free ● Don't have lots of small fees	● Train your staff to be more friendly ● Keep the rooms cleaner ● Hire more security	● Add or improve pools or hot tubs ● Open a nice coffee shop or restaurant in your hotel ● Soundproof the rooms

THANKS!